

AMENDMENTS TO THE DRAWINGS

Responsive to paragraphs 5-7 of the Office Action, a corrected replacement drawing for Figure 1A, labeled as PRIOR ART and renumbered as Fig. 1A, is attached hereto.

REMARKS

This AMENDMENT UNDER 37 CFR 1.111 is filed in reply to the outstanding Office Action of December 15, 2003, and is believed to be fully responsive thereto for reasons set forth below in greater detail.

Responsive to paragraphs 5-7 of the Office Action, a corrected replacement drawing for Figure 1A, labeled as PRIOR ART and renumbered as Fig. 1A, is attached hereto.

Reconsideration is respectfully requested of the objection to Figure 2A as the designation of PL, indicating Passgate Left, and PR, indicating Passgate Right, is believed to be entirely proper, even though they are the same type of transistor. The mere fact that they are the same type of transistor does not mean they must have the same designation, particularly since they function differently, since PL functioning as the left passgate will be operative at different times than PR functioning as the right passgate, and therefore the explanations of operation are different for the differently designated PL and PR, which is believed to be entirely proper and appropriate.

Responsive to paragraphs 8 and 9, claim 3 has been amended as suggested, which error apparently occurred during electronic filing.

Initially, the Examiner is thanked for the indication of allowable subject matter in claims 3-11.

Reconsideration is respectfully requested of the rejection of claims 1-2 under 35 USC 102(e) as being allegedly anticipated by Jin et al.

The following comments and analysis was provided by the inventor Robert Wong who is a person highly skilled in the art of the present invention.

Jin

The Jin patent is believed to be irrelevant to claims 1 and 2. The Jin patent describes a conventional 16 T CAM cell that has been common in the prior art market for several years.

The circuit consists of two 6T SRAM cells and one 4T compare circuit, and has four nfet passgates 38a, 38b, 40a and 40b.

Accordingly, claim 1 distinguishes over Jin by specifying that the first and second SRAMs have P-channel PFET passgates.

Foss

However, Figure 2 of Foss discloses a CAM cell having four pfet passgates. Foss, however, does not disclose or teach in any respect the subject matter of claim 2, which has been incorporated into claim 1 to distinguish over Foss.

The Foss patent claims to optimize layout by using equal numbers of pfets and nfets among the 16 transistors, either by replacing the nfet passgates by pfets of the 2 SRAM cells (claim 3 and Fig. 2), or by replacing the 4 nfets in the compare circuit by 4 pfets (claim 4 and Fig. 3).

Fig. 2 of Foss is similar to the circuit schematic of Fig. 2A of the present invention. However, the circuit schematic of Fig. 3 and the 'compact layout' of Fig. 4 of Foss doesn't have the pfet passgates present there. Only the labels of the pfet passgates P3 and P4 are in the 'compact layout' of Fig. 4. If a normal Poly word line is added to the layout of Fig. 4, then there is no area savings by the replacement of the nfet passgates. That SRAM topology can hardly utilize the common n-well for the pullup and passgate devices for area saving.

The Foss patent discloses replacing the n passgate devices with p passgate devices, with Figure 2 illustrating the resulting circuit with p passgate devices P3, P4, P13 and P14, and Figure 1 illustrating half of Figure 2. Figure 4 illustrates a half-cell circuit layout corresponding to Figure 1.

The replacement of n (n-channel) passgate/access devices by p (p-channel) passgate/access devices is described at column 3, lines 32-45, as follows.

"A reduction in ternary CAM cell area and optimization of a CAM cell layout is achieved by replacing n-channel access devices and providing an active logic '0' activated word line instead of an active logic '1' activated word line. An SRAM cell

with p-channel access devices is not normally used in conventional commodity or embedded SRAM applications due to the speed advantage of switching n-channel devices over p-channel devices. In a regular SRAM memory, the switching speed and other characteristics would suffer as a result. However, in a CAM cell, performance of the read/write is less critical than in a conventional SRAM cell since the primary task a CAM memory performs on a regular basis is a search and compare function.”

Merely replacing the nfet passgates with pfets in Foss would render the memory cells ‘unwritable’ unless the pfets are sufficiently strong. A “strong” pfet passgate does not just compensate for the slower performance of the pfets. It also provides write functionality in standard SRAM designs.

A strong pfet passgate as specified by claim 2 must be included to make the circuit operable, and this feature is not disclosed or taught by Foss or Jin.

Claim 2 specifies a reverse beta ratio of substantially 2. This provides the write functionality, and allows a smaller layout because the SRAM pulldown devices can be reduced. Moreover, performance is not degraded by the smaller layout.

If a conventional nfet passgate is merely replaced by the same size pfet, as disclosed and taught by Foss, the reverse beta ratio is about 0.3 - > 0.5, and performance would degrade by ~2X.

Accordingly, Foss clearly fails to disclose or teach the limitations of claim 2 which result in significant advantages in the present invention.

Accordingly, amended claim 1 with the combined limitations of claims 1 and 2 is believed to distinguish clearly over the prior art.

This application is now believed to be in condition for allowance, and a Notice of Allowance is respectfully requested. If the Examiner believes a telephone conference might expedite prosecution of this case, it is respectfully requested that he call applicant's attorney at (516) 742-4343.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "William C. Roch". The signature is fluid and cursive, with the first name "William" and last name "Roch" clearly distinguishable.

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